

AGRICULTURAL EXPERIMENT STATION of the ALABAMA POLYTECHNIC INSTITUTE

M. J. Funchess, Director

Auburn, Alabama

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AGRICULTURAL OPPORTUNITIES and PROBLEMS of the SOUTH from the RESEARCH POINT of VIEW¹

M. J. FUNCHESS, Director

THE DIRECTORS of Experiment Stations, the directors of Extension Services, and the men responsible for the work of the various bureaus of the USDA together make up the most important group of men that are dealing with the problems of Southern Agriculture with the aim of opening up new and larger opportunities for farm people. It is a great honor, a great opportunity, and a great responsibility that I have in speaking to you on the problems and potentialities of the area. In dealing with this very broad assignment, it is recognized that there are few, if indeed any, persons who know the South so well that such a discussion by one man can be full, complete, and comprehensive for all the different agricultural regions of the Southern States. It must be understood at the outset, therefore, that your speaker is drawing on his experience in a certain part of the region, and that the suggestions, discussions, and examples will be of most value if they stimulate all of us to give careful and sustained thought to the solution of similar problems in the respective areas we serve.

Before dealing specifically with the assigned topic, it should be profitable to consider some of the fundamental changes that are taking place on farms of America. Hybrid corn has added hundreds of millions of bushels to the American crop. Corn planted on 99 million acres in 1929 pro-

duced 2.5 billion bushels. Twenty crop years later, there were 12.9 million acres less and 1.1 billion bushels more corn. From the crop year of 1929 to the crop year of 1949, cotton acreage declined from 43.2 million to 22.7 million acres, but the crop of 1949 was 43 thousand bales larger than that of 1929. Tractors on farms increased from 1,567,000 on January 1, 1940, to 3,250,000 by May 1, 1948, an increase of 107 per cent in 8 years. During the same period, the number of mules and horses on farms decreased from 14.5 million in 1940 to 8.3 million in 1949. This decrease in number of workstock on farms released several millions of acres of land that should be used for commercial crop production. The enormous increase in use of power and machinery on farms is shown by data in Table 1.

No picture of changes in agriculture would be even reasonably complete without considering fertilizer consumption. In 1935-39, there were 523,000 tons of fertilizer used in Alabama. Consumption increased to 900,000 tons in 1946. For the same years, American consumption rose from 7,585,000 to 16,087,000 tons. There has been an enormous increase in use of fertilizer in the Middle West during recent years. And while these changes and adjustments were taking place, the American farm population decreased from 30,269,000 in 1940 to 25,190,000 in 1945, a loss of about 5 million people at a time when war industries and armed forces had absorbed a maximum number of farm people. By 1948, when the immediate postwar adjust-

¹ Presented at the conference of Experiment Station Directors, Extension Service Directors, and Bureau Chiefs of the USDA in Oklahoma City, Oklahoma, May 15, 1950.

TABLE 1. NUMBER OF TRACTORS AND OTHER SPECIFIED MACHINES ON FARMS IN THE UNITED STATES — JANUARY 1, 1910-1949*

Year	Farm tractors	Farm motor-trucks	Farm auto-mobiles	Grain combines	Corn pickers	Milking machines
	<i>Thousands</i>	<i>Thousands</i>	<i>Thousands</i>	<i>Thousands</i>	<i>Thousands</i>	<i>Thousands</i>
1910	1	0	50	1	—	12
1920	246	139	2,146	4	10	55
1930	920	900	4,135	61	50	100
1940	1,545	1,047	4,144	190	110	175
1941	1,675	1,095	4,330	225	120	210
1942	1,885	1,160	4,670	275	130	255
1943	2,100	1,280	4,350	320	138	275
1944	2,215	1,385	4,185	345	146	300
1945	2,422	1,490	4,152	374	168	365
1946	2,585	1,550	4,150	415	200	465
1947	2,800	1,730	4,520	450	225	580
1948	3,150	1,920	4,930	520	300	640
1949	3,500	2,000	5,250	590	365	685

* Changes in American Farming, Sherman E. Johnson, BAE, USDA, Dec. 1949.

ment of population was apparently complete, the number of farm people was estimated at 27,440,000, still nearly 3 million below the 1940 level. These are samples of the great changes that have been taking place in American Agriculture during the past 10 to 20 years.

PROBLEMS

The foregoing general background picture of American Agriculture shows that great progress has been made in recent years. Frequently southern agricultural workers use the generalized picture and confuse the listener as to the progress — the rate of progress that is being made in the South. It is fitting, therefore, for us to consider southern agricultural problems if we are to have a really clear picture of what our situation is and what we need to do about it.

Low Income. Southern farmers receive the lowest per capita income of all farmers in the United States. The following tabulation sets forth some comparisons:

UNIT	<i>Income per Farm Person in Dollars</i>	
	<i>1924-28</i>	<i>1944-48</i>
Alabama	146	333
Georgia	155	436
Oklahoma	339	841
Iowa	742	2,330
Thirteen Southern States	211	573
United States	370	1,073

The reason is simple. Southern farmers produce too little for sale on a per capita basis. If this statement is correct, then the most important of all farm problems is increased production of farm products. About 49 per cent of all American farm people live in the 13 Southern States. However, it is estimated that in 1948 southern farm people received as cash receipts the following percentages of the total cash sales from the commodities indicated:

COMMODITY	<i>Cash Receipts as Per Cent of Total*</i>
Corn	14
Wheat	15
Oats	10
Hay	15
Cattle and Calves	23
Hogs	14
Dairy products	14
Eggs	17
Chickens and broilers	46

* Farm Income Situation (FIS-109), June 1949.

If these data mean anything at all, they mean that southern farmers must produce more to sell or continue to be poor. Until we understand this to be the paramount problem in Southern Agriculture, we as agricultural workers and leaders are not in position to render to Southern Agriculture the best possible service from the agencies that we represent. And the need of southern farmers for a better income is so great that we must not let the appar-

ent oversimplification of this fundamental problem mislead any of us or permit us to fail to put first things first.

The Place of Cotton. It is absolutely essential that all agricultural agencies that would serve the southern farmer have a clear picture of the place of cotton in the southern farm program. At the risk of offending those who consider cotton sentimentally, emotionally, or promotionally, let me say that the South can never be prosperous on cotton as long as it takes 200 hours and more of human labor to produce and pick a bale of the crop. Horne² says, "Cotton is the leading source of income in the poorest section of the United States. More than 1,500,000 families normally depend for a living on the farms that grow it. No other economic group in the nation is so large and so poor." From the beginning, it took about 70 hours of labor to pick a bale of cotton. It takes that same amount of labor today. Improvement has been made in cotton production programs but not in harvesting where the crop is hand-picked. The labor charge against most other crops of importance has been greatly reduced as a result of the adoption of improved methods of production and harvesting.³ Exceptions will be found in Table 2.

This brings me to a subject on which I wish to put special stress. Cotton can be harvested rapidly by use of relatively inexpensive strippers, but the "stripped" cotton is quite "trashy." At present there is no ginning equipment that will clean well stripped long-staple cottons adapted

to the Southeast. The development through research of ginning equipment that will clean cotton harvested by inexpensive strippers is the **most important research problem** that might be tackled in the interest of **Southeastern Agriculture**. The Alabama Station has stripped cotton at the rate of a bale per hour, using a machine developed by one of the machinery manufacturers. Let's reduce labor by 65 hours per bale in harvesting, and save 650 million hours of backbreaking human labor!! Shall we say it can't be done and let it go at that? We have not taken that attitude toward other difficult agricultural problems. What would it cost? One million dollars per year for 20 years to support research on a comprehensive scale to develop cheap, efficient cotton strippers and gin equipment to clean the trashy product is as nothing compared with the saving annually of 650 million hours of human drudgery. This is no small problem, and it should not be tackled in a small way. The development of a gin that will clean stripped cotton will mark just as great a change in the handling of cotton as did the invention of the cotton gin. As leaders in agriculture, we should make a concerted effort to have something done immediately about a matter of so great importance.

There is an old experimental gin plant in the Delta. When there was an opportunity to establish a new one, it was located at the Agricultural and Mechanical College in New Mexico. The problems of the cotton producer of the Southeast did not weigh heavily enough to have this new plant located in that area. To help farmers in the Southeast, we need a comprehensive program that might well cost a million dollars a year, including very

² Cotton's Way Forward, M. K. Horne, Jr., Univ. of Miss. 1949.

³ Changes in American Farming, Sherman E. Johnson, USDA, Dec. 1949.

TABLE 2. AVERAGE HOURS OF LABOR PER UNIT OF PRODUCTION

Crop	Unit	1910-14	1925-29	1935-39	1945-48
Corn	100 bu.	135		112	67
Oats	100 bu.	53		35	23
Hay	1 ton	10		9	9
Sweet potatoes	100 bu.	140		137	123
Cotton	1 bale	277		210	182
S. E. Cotton*	1 bale		289		209
Tobacco	100 lb.	44		47	43

* For Florida, Georgia, North Carolina and South Carolina -- by private correspondence, O. V. Wells, Chief, BAE, USDA.

large storage space for a bulk supply of cotton on which the gin might maintain continuous operations from year to year. Our area cannot be prosperous on hand-picked cotton. Horne, in his publication "Cotton's Way Forward," states, "The surest way to measure the income of cotton farmers is to examine the actual experience of areas in which cotton growing is highly concentrated. Such an area is roughly defined by the boundaries of Mississippi. No other state depends on cotton so heavily. Mississippi grows cotton in 80 of its 82 counties and gets more than half of its entire cash farm receipts from cotton and cottonseed. The great majority of the farms in this state are distinctly cotton farms.

"In 1947, the average cash receipts from all farm sources, per person living on a farm in Mississippi, were about \$397. In 1948, with the most valuable cotton crop on record, the figure was \$435 per person. These figures reflect **gross receipts**, out of which had to come the costs of seed, fertilizer, poison, ginning, taxes, depreciation and repairs, rent, interest, management, and wages to non-farm-dwelling laborers. The net cash income per person on a Mississippi farm was a great deal lower than these figures. And yet these **gross receipts** were little more than one-fourth of the average **net income** per person in the whole population of the United States.

"Such was the situation in 1947 and 1948, when the prosperity of cotton farmers was actually a subject of much comment. In relation to the past, the average cotton farmer was indeed prosperous, for the wide-swinging price of cotton rises higher than other prices in good times just as it drops lower than other prices in hard times. But in comparison with anything in this country except his own past, the cotton farmer was not prosperous, even in 1947 and 1948."

Cotton Statistics. This subject has been before the public so much that it will be dealt with briefly here. Horne⁴ presents figures to show the increasing production of rayon. In 1920, it was equivalent to 24,000 bales of cotton, but, by 1949, it was equivalent to 2.9 million bales.

The American cotton farmer was losing

out in the world cotton market before the last World War. In the period of 1925-30, exports amounted to 8,250,000 bales. Exports dropped to 5,306,000 bales in 1935-40. There are those in official positions who firmly believe that our cotton export market will dwindle to still smaller figures as funds from the Marshall Plan are reduced. If, finally, the cotton farmer finds only the American market for his cotton, income from the crop will have shrunk to relatively small proportions, indeed. At best, it has represented only from 6 to 8 per cent of the American farm cash income. In this same period of 1935-40, foreign mill consumption of cotton rose from 18,460,000 to 21,600,000 bales. Also, in the same period, foreign production increased from 10,660,000 to 16,780,000 bales. Increase in the world crop came from foreign production.

Cotton is a sick crop and there is nothing in sight to indicate that it will get well in the near future. In the good year 1950, the acreage planted to cotton will be roughly half of that devoted to the crop 25 or 30 years ago. And, if this proves to be a good crop year, the acreage may be cut still further in 1951. In the whole history of **American Agriculture**, no other major crop has had such a record.

In research programs dealing with cotton, much emphasis should be placed on improvement of quality of the fiber and reduction of the cost of production. The crop is too important to **Southern Agriculture** for us to ever slacken our effort to help the farmer produce good cotton at as low cost as possible. Research work that contributes to the solution of these problems will always be important.

Under conditions that have forced and are still forcing a decline in both planted acreage and marketable crops, cotton farmers have faced and must continue to face drastic changes in their whole program. Their success or failure will depend in large measure on their **choice of changes**. As agricultural leaders, it is our job to help them make the right kinds of changes in their program.

Possible Changes in Southern Agriculture. Clear thinking is needed when we come to consider the possible changes and improvements in the farm program of the South. It is important that we understand well that increased production of any

⁴ Horne, *op. cit.*

TABLE 3. CASH RECEIPTS FROM FARM MARKETINGS BY COMMODITY GROUPS IN THE UNITED STATES IN 1948.*

Commodity	1,000 Dollars	Per cent
Meat animals	9,358,893	30.6
Dairy products	4,432,986	14.5
Poultry	3,071,440	10.1
Other	197,459	0.7
Total from livestock	17,060,778	55.9
Food grains	2,585,916	8.5
Feed crops	2,126,520	7.0
Cotton lint and seed	2,492,343	8.1
Vegetables	1,976,184	6.5
Fruits and tree nuts	1,173,509	3.8
Tobacco	975,304	3.2
Oil bearing crops	1,069,639	3.5
Other crops	1,085,301	3.5
Total from crops	13,484,716	44.1
TOTAL FROM MARKETINGS	30,545,494	100.0

* FIS-109, June 1949.

farm commodity is dependent on a market outlet for that commodity. Therefore, let's spend a little time considering the possibilities of disposing of increased quantities of certain commodities, or types of commodities, that might be produced in our area as we **change** and **improve** our program.

The American consumer spent more than 30 billion dollars for farm products in 1948. Fifty six per cent of this was for animal products and 44 per cent for cotton, food grains, vegetables, tobacco, fruits, nuts, etc. Detailed data are set out in Table 3.

Cotton brought only 8.1 per cent, tobacco 3.2 per cent, and peanuts 0.7 per cent of the total cash income. These are the chief cash crops of the South. All vegetables, fruits, and nuts brought in only 10.3 per cent of the total. Since cotton now occupies millions of acres less than formerly, and since there is a probability of the acreage being still further reduced, it is imperative that cotton farmers use for other productive enterprises these acres that have been vacated by cotton. And it should be mentioned at this point that there are already several million acres of idle land in some of the southern states, even though some of us continue to explain our low income as being due in

part to the fact that there is so little land per capita available to southern farmers. To be even moderately prosperous, southern farmers must have a farm program that calls for the use of all of their available land, with each acre producing at the highest level compatible with economic production. Agricultural leaders of the South have never had a more important or a more difficult task than that of trying to help meet the severe problems of adjustment that must be made on southern farms. To what extent can this problem be solved by including annual harvested crops in the program? The prospect is dim. Between 1929 and 1946, total acreages of apples, peaches, pears, grapes, plums, prunes, figs, cranberries, and strawberries declined.⁵ However, the acreage of **commercial truck crops** increased by 948,000 from 1929 to 1948. Acreages of commercial truck crops for 1948 are shown in Table 4.

During this period, 1929-1948, Alabama alone lost 2,060,000 acres of cotton. Alabama may lose half as many acres of cotton between 1949 and 1950 as the total acreage **gained by commercial truck crops** in the preceding 20 years in the entire United States. From the year of maximum cotton acreage to the year of lowest acreage,

⁵ Agricultural Statistics, USDA, 1949.

TABLE 4. ACREAGES OF COMMERCIAL TRUCK CROPS IN THE UNITED STATES IN 1948*

Crop	Fresh market	Process- ing	Total	Crop	Fresh market	Process- ing	Total
Artichokes	7,450	-----	7,450	Honeyball	-----	-----	-----
Asparagus	42,760	80,870	123,630	melons	1,100	-----	1,100
Beans—	-----	-----	-----	Honeydew	-----	-----	-----
green lima	14,450	86,010	100,460	melons	11,700	-----	11,700
Beans — snap	173,950	94,500	268,450	Kale	1,300	-----	1,300
Beets	10,450	12,990	23,440	Lettuce	202,000	-----	202,000
Cabbage	179,500	19,270	198,770	Onions	127,510	-----	127,510
Cantaloupes	122,360	-----	122,360	Peas — green	37,250	372,830	410,080
Carrots	75,400	-----	75,400	Peppers	33,450	-----	33,450
Cauliflower	38,300	-----	38,300	Pimentos	-----	14,300	14,300
Celery	40,330	-----	40,330	Shallots	4,800	-----	4,800
Corn — sweet	61,200	474,420	535,620	Spinach	59,060	21,550	80,610
Cucumbers	54,050	122,420	176,470	Tomatoes	238,780	410,500	649,290
Eggplant	6,680	-----	6,680	Watermelons	255,990	-----	255,990
Escarole	3,100	-----	3,100				
Garlic	3,020	-----	3,020	TOTAL	1,805,940	1,709,660	3,515,600

* FIS-109, June 1949.

either of the states of Georgia, Alabama, or Oklahoma lost nearly as many cotton acres as the total acreage devoted to commercial truck crops in the entire United States, which was about 3,500,000 acres in 1948. Comparative acreages of major crops and crop groups are shown in the following tabulation:

CROP	1949 Acreage
Corn	86,735,000
Wheat	76,751,000
Hay	72,835,000
Oats	40,560,000
Cotton	26,898,000
Commercial truck crops	3,515,600*

*1948 acreage, latest available

Considerable time has been devoted to this phase of the production problem because many people in high places — professional and political — apparently do not understand at all well the relative impossibility of utilizing much land or labor in truck crop enterprises. When farmers overproduce perishables, the surplus is practically lost, after having depressed the market for that part of the crop that may be sold. The lack of adequate marketing research by experiment stations is the usual explanation of the farmer's troubles when this kind of situation develops. Some of us fail to or refuse to understand that no amount of time and money spent on marketing research will find a nonexistent market. In the light of the difficult prob-

lems involved in marketing perishables and in the light of the fact that the demands of the American market are met by the use of a relatively small amount of land and labor, it does not appear at all possible for the southern farmer to devote more than a tiny fraction of his released cotton acres to the production of commercial acreages of fruits, nuts, vegetables, or other more or less perishable products.

Most of the staple crops may be in surplus production in the immediate future also. There is little possibility for additional farmers to grow tobacco. Southern farmers would find it very difficult, if not impossible, to grow commercial corn, wheat, oats, or hay in competition with midwestern states. Soybean acreage and production have expanded rapidly in recent years, but this crop may be in surplus production this year. It is quite unnecessary to expand this further, since all agricultural workers probably understand this situation already. Then, you ask, is there any hope for the improvement of their farm programs by southern farmers? The answer is YES.

OPPORTUNITIES

Southern farmers have the opportunity to greatly improve their programs and increase their incomes by adding livestock production enterprises to their farm program. This will be no easy job. Therefore, let's consider briefly some things that must be taken into account when we attempt

to introduce livestock production on a real commercial scale in the South.

We must meet competition. There is no waiting market of consequence for any farm produce. If we are to meet competition, we must have efficient production. Competition forces efficiency, or a lower standard of living if it can't be met, and, finally, if it is keen enough, abandonment of the enterprise.

There are markets for livestock and livestock products. In most sections of the South, there are auction markets available that handle all forms of livestock. To a less extent, there are outlets for process plant milk. As of March 25, 1950, a Carnation milk plant at Dadeville, Alabama, was receiving 40,000 pounds of milk per day but could handle five times that much. The price paid was \$3.05 per hundred, 4 per cent base. On the same day, a Grade A handler in Opelika, 25 miles away, was paying \$5.81 per hundred, 4 per cent base.

There are markets for forest products. A new paper mill that started operations in Alabama this year needs annually 230,000 cords of wood. This is an additional demand on the timber lands of Alabama for forest products, and the demand should be met by a production program that will insure a supply of wood from this time on. There is need for greatly expanding the research program on forest production if the farmers who own millions of acres of land that should be in productive forests are to receive the help they need in dealing with this problem.

Cotton still brings in more income in a number of southern states than anything else. But should it? Some of us appear to boast of the large cotton sales. But when we recall that the crop usually occupies 20 per cent or less of our available cropland, should we not really be ashamed to state that cotton brings in more money than all other products combined? Any state is a poor state where this relative condition exists. What a sad commentary on our farm program when a fifth of the land brings in half the income, or more!

We have no obligation to avoid competition with other sections. Nevertheless, when groups are advised to increase their income by producing livestock of some kind, almost invariably someone brings up the question of possible overproduction in

that field. But few southerners have complained because the soybean crop of the Midwest has captured their old market for cottonseed meal and depressed the market for cotton and peanut oils. Nor has anyone said much about the competition by the far West for a large share of the cotton market. California ranked fourth last year in cotton production. Do we fear overproduction in other things more than we do in cotton?

An increase in production of livestock in the South means a greater share of the consumer's dollar for the area. No one could logically claim that such an increase would not cut into the income of other sections. It would. If we can produce farm commodities cheaply enough to capture and hold a part of the existing market, it is our right to do so. It has been done before. Witness what has happened to us by the enormous increase of soybeans in the Midwest, and the expansion of cotton in the far Southwest.

The South has no obligation to maintain an uneconomic type of farming simply to avoid displacing labor. As agricultural leaders, we have an obligation to do what we can to develop programs suitable to our area that will improve our economic status; in all probability, as this is done there will be a surplus of farm labor in most of the Southern States. Much of the dense farm labor population now finds employment only because we use hand labor to chop, hoe, and pick most of our cotton crop.

In Alabama, 85.7 per cent of cotton farmers had 14 acres or less in cotton, as of 1944. There were 123,659 farms in this group. It is reasonable to assume that all of these were relatively small farms. Consequently, we must seek ways and means whereby both the small and large farmer may improve their lot. And this is going to be a difficult job, especially for small farmers.⁶

Then there is the problem of adequate credit of the right kind. When farmers try to change from the old, simple cotton and corn program, they may need credit in greater volume and of more flexibility than they have ever had before. There will be needed new fencing, lime, fertilizer and seed, farm machinery, broodstock, etc.,

⁶ Data supplied by O. V. Wells, Chief, BAE, USDA, by private correspondence.

all of which call for cash outlays at one time. Returns on these kinds of expenditures may be spread over 5 to 10 years. Loans on these types of outlay may not be repaid in one year, as was expected from production loans in the old days. Both agricultural workers and credit agencies need to study this problem and try to develop credit practices adequate to meet the needs of farmers.

And, finally, as one of the most important background discussions, let's understand that both surpluses and competition, which surpluses surely increase, as well as the changing type of Southern Agriculture, call for an ever-expanding program of research and education if our area is not to lose out in competition for market outlets for its farm products. If we do not produce any particular commodity, someone else will. Midwestern farmers will gladly supply us with milk, cheese, etc. Synthetics are already taking a large share of the old cotton market, and, according to news stories in the papers, there may be vast improvements in the rayon manufacturing process in the immediate future. Midwestern farmers can and will also supply meat to the South, as they have done in the past, unless we capture the market and hold it. Those who stand still or move too slowly in both research and education are bound to lose the contest for market outlets for their products. Eternal effort in these fields is the price of economic success.

A little while ago it was stated that southern farmers might increase their income by adding livestock enterprises to their farm program. Today we are the guests of a state that has materially changed its farm program, and has a per capita farm income that is nearly twice as great as that of farmers in such states as South Carolina, Georgia, Alabama, and Mississippi. Yet, from 1929 to 1949 the Oklahoma cotton acreage dropped from 4,275,000 to 1,300,000, a loss of 2,975,000 acres. From 1924-28 to 1944-48, sales from livestock in Oklahoma increased from 96 million to 290 million dollars. With about 65 per cent as many farm people as has Alabama, Oklahoma is producing 200 million odd dollars worth of farm produce more than Alabama. From 1924-28 to 1944-48, the increase in sales of livestock in Oklahoma was just about \$200,000,000.

Reducing the cotton acreage in Oklahoma has certainly not hurt the State's farm income.

Now, I am again presenting some information about farm-size production experiments in Alabama to try to prove to you that there are still grounds for hope for a much better and more productive farm program in at least our part of the Cotton Belt. And again I begin this consideration by presenting to you the basic figures for a 12-year-old cotton-hog unit. This report is for the year 1949.

This 96-acre farm is entirely typical of the Sand Mountain area of Alabama, except that it is larger than the average. There were planted or used in 1949, 17.2 acres of cotton, 40.3 acres of corn, 7 acres of grain sorghum, 10 acres of alfalfa, and 7 acres of annual clover for grazing. Cash expenses for fertilizer, feed (\$256.40), extra labor, seed, taxes, insurance, repairs, gas and oil, etc., amounted to \$2,257.19. Cotton and seed sales amounted to \$2,672.40. Hog sales totaled \$3,687.65. Cull milk cows, clover seed, hay, eggs, and cull hens brought in an additional \$540.59. The total cash sales were \$6,900.59. From this 96-acre farm, after taking out all cash costs, there was left \$4,643.40 as returns for operators' labor and return on investment. Two men do all of the regular work on the farm. This has always been a 2-man farm and it still is. The difference now is that it produces pretty good yields of corn, which is fed to hogs in a simple production program. In each year of operations, above average yields of cotton have been produced. But there has been more cash sales of hogs than of cotton, from year to year.

We now have in its third year of operation a 30-acre cotton and poultry unit at our Sand Mountain Substation. In size and soil type, it is representative of many thousands of farms of the Sand Mountain area. Here is a brief financial statement covering operations for 1949. There are 6 acres in cotton, 16.5 in corn, 5 in oats, and one in alfalfa. Cash expenses were as follows:

Fertilizer	\$ 309.50
Feed	1,951.50
Extra labor	
(picking cotton chiefly)	110.50
Seed	50.50

Taxes and insurance	47.80		
Repairs	37.70		
Gas and oil	93.04		
Miscellaneous (chicks, chiefly)	518.95		
Total	\$3,119.89		

There were the following cash receipts:

Cotton and seed	\$ 964.86
Eggs	4,011.13
Cull hens	519.37
Feed sacks	45.00
Total	\$5,540.36

		Acres
Crimson clover - sericea	25	
Crimson clover - ryegrass	11	
Oats	5	
Alfalfa	9	
Kudzu	13	
Grain sorghum	4	
Permanent pasture	8	

In this year's operations, there was left \$2,420.47 to pay for operator's labor, management, depreciation, etc. Again, this farm will produce nearly as much cotton as the average of its size, but it has a much better income than cotton farms due to the sale of eggs in addition to cotton.

There will be no better place in this discussion to again emphasize the importance of adequate credit for those farmers who try to improve their farm programs. If there were nothing but cotton produced on this farm, its credit problems would be simple. But when chickens are added to the program, and a small tractor is used to make more efficient use of the time of the one man who does the major part of the work on this unit, the credit needs of this little farm are greatly increased. Without adequate credit, a farmer would find it extremely difficult to change his small low-capitalized farm to one of the type here described.

In all probability, the Piedmont section of the Southeast is more of a real problem area than any other. In general, all of the land is rolling to hilly, and has suffered seriously from erosion. A few years ago a substation was established in the Alabama Piedmont as part of the Alabama Agricultural Experiment Station system. A cotton-dairy unit was established as part of the program of the substation, and here is a brief report on the third year's operations. Before presenting the data, let me stress the point that this unit is established on badly eroded, gullied land, some of which had been abandoned by previous owners. Now, here is the summarized financial statement for a year of operations. The following shows the present use of the 75 acres that support the dairy operation:

Last year's sales amounted to \$2,487 for milk, \$1,540 for cotton from 11 acres, and \$181 from miscellaneous items, or a total sales of \$4,208. Total cash charges against operations, such as fertilizer, seed, hauling milk, etc., amounted to \$2,076, leaving a cash balance of \$2,132 plus \$815, the value of replacement heifers produced in the meantime, or a total of \$2,947 to pay for farm labor (2 men), depreciation, management, etc. This unit was started on land that was in such bad condition that two men could not possibly make a decent living by row crop production. And the cows were of the quality that could be bought in the community. At present prices for milk and cotton, and with improvement of both herd and land, this unit should produce double the above returns to labor, management, etc., in 3 to 4 years.

At the Black Belt Substation, 80 acres of land are devoted to production of milk to be sold to a cheese plant. This area supports a herd of 25 cows and 5 replacement heifers. There are no row crops. Each year, about \$100 worth of cottonseed meal is fed. For the 3-year period ending March 15, 1948, average annual income from milk was \$3,547.72, with a cash charge of \$929.32 against the operations for fertilizer, cottonseed meal, farm machinery hire, hauling milk, etc. For labor, management, depreciation and the use of 80 acres of land, there was a balance above cash outlay of \$2,618.40. Both the herd and the land are steadily improving, and it is believed that the program that has been developed will make it possible to produce milk as economically as can be done elsewhere.

At the Gulf Coast Substation, a milk production unit has been in operation for 8 years. Approximately 95 acres of land are used for improved pastures, temporary pastures, and a varying acreage of alfalfa, corn, and kudzu, with a limited acreage of sudan grass following the temporary crimson clover-ryegrass pasture.

The dairy herd includes 32 cows, 4 bred heifers, 2 yearling heifers, 4 calves, and one bull, and are all supported by the land and crops listed. In 1949 cash outlay for all fertilizer, seed, etc., amounted to \$1,265.46. The herd was fed 12,400 pounds of cottonseed meal at a cost of \$741.75, or a total of \$2,007.21. Cash sales were:

201,330 pounds of	
Grade A milk	\$13,052.55
12 calves and cull cows	518.89
Seed	427.65
Total	\$13,999.09

This leaves \$11,991.88 to pay for the labor involved, depreciation, insurance, taxes, and management. The average price received for milk was \$6.49 per hundred pounds. This unit is located 3 miles from Mobile Bay and about 20 miles from the Gulf. It is about as far south as it can be unless it is moved to Florida. The results might have been better in some other climate, but the Alabama Station feels that the foregoing record does not disgrace us. Even at Grade B milk prices, these 95 acres would make a pretty good showing.

Another of the production units of the Alabama Agricultural Experiment Station system is the dairy-hog unit operated by the Tennessee Valley Substation. Ninety acres of land are used in the program. Since the cropping system is changed from time to time, no effort is made to give the details here. At the moment, we are most interested in the possibilities of such a program. In 1949, the tenth crop year of this experiment, there were sold from the 90 acres \$3,171.30 worth of hogs, \$3,503.58 worth of milk (Grade B), \$756.00 worth of oats, \$2,025.00 worth of crimson clover seed, and \$945.88 worth of cull cows and surplus calves. Cash charges against operations, for land preparation, planting, harvesting of crops, concentrates, etc., amounted to \$3,276.65. For the 90 acres, this leaves a balance of \$7,125.00 for labor of milking, use of land, depreciation, and management.

Most of the feed requirements throughout the year are supplied from grazing temporary and permanent pastures. About 1,500 pounds of home-grown hay is fed per animal during bad weather when for-

age crops cannot be grazed. The only bought feed was 2,966 pounds of concentrate fed the entire herd of about 25 cows or about 120 pounds per head.

Even though this is not the time and place for a detailed discussion of the production program, a word of explanation regarding the program should be helpful. The cows get all winter feed (except in very bad weather) from temporary pasture of crimson clover-ryegrass or from oats that are used for temporary grazing. The crimson clover-ryegrass mixture furnishes grazing from October to April. The oats furnish grazing from October until March. By allowing a grazing-free period of 3 to 4 weeks in May, a clover seed crop is matured. After the seed are combined, the land is planted to grain sorghum, which in good seasons has produced 50 to 75 bushels per acre. Here is the basis for cheap hog production. Consequently, what started out to be a milk production program was almost of necessity changed to a milk and hog program. The production of grain from the temporary winter oats grazing crop also came in almost incidentally, since it was found to be easy to produce 50 to 75 bushels of oats per acre by stopping the grazing in March and applying a good top-dressing of nitrogenous fertilizer. Here we have a program that omits cotton entirely, but one that produces a good income.

The Tennessee Valley Substation is also operating a new beef production unit involving the purchase of steers that are pasture-fattened and sold directly from the grazing area. Most of the grazing is available during the late fall, winter, and early spring months. One of the newest features of our grazing program is the production of winter forage. As a matter of fact, it now appears to be easier to provide adequate grazing for cattle in Alabama during the period from October to May than it is to provide grazing from May to October. This steer-fattening unit is supported by 182 acres of land that are devoted to improved pastures, temporary pastures, etc. In 1949, 123 steers were bought on the local auction markets, fattened on the 182-acre unit and sold on the same local markets through which they were bought. These 123 steers gained 30,615 pounds while on the grazing unit. After paying all cash expenses for seed,

fertilizer, labor, machinery hire, drugs, and veterinary services, there was a cash balance of \$4,902.76 to pay management, use of land, depreciation, etc. According to the actual labor records for this unit, it took only about half of one man's time to handle it. This type of beef production program has a number of hazards in it, but it also offers promise of fitting into the program of both small and large operators.

This paper has been extended in order to present a number of different types of production units now in operation by the Alabama Station. The 30-acre poultry-cotton unit at the Sand Mountain Station is an example of an intensive program applicable to small farms. In contrast, the 182-acre steer unit at the Valley Station uses only about half of one man's time and is an example of an extensive enterprise. The other units fall in between these two in labor requirements per unit of land. And each of these units indicates that there are opportunities for a vastly improved agricultural program in our area. To be sure, a farm program that is patterned after any one of these units will call for more total hours of work than a cotton farm requires, and it will call for careful and intelligent management by the operator. But if the income is to be better, a better job is required. There is no easy way to earn a good living on a farm.

Throughout this paper, there are research implications. Let me bring this discussion to an end by specifically indicating certain lines of research activity that should yield results of much importance to southern farmers as they attempt to change and improve their farm programs. The whole field of plant breeding is inviting. There is great need for high-yielding, disease-resistant grain and forage crops. In pasture research — for both permanent and temporary grazing — there is also great need for more research on the compatibility of grasses and legumes. We hear much of such new crops as Ladino clover and fescue grass, but we know little about soil adaptation and compatibility of these two crops. Pasture management studies are expensive, but are necessary if the livestock man is to know how to get the best results from his grazing lands.

As the emphasis on livestock increases, so must there be an ever increasing em-

phasis on research on animal breeding and animal diseases. Breeding for disease resistance in animals should be a particularly inviting field. The Auburn strain of disease-resistant poultry is a good example of the potentialities of such research. There may be very great opportunity for production of animals that make more efficient use of feed and forage. Progress in animal breeding may be accelerated if we put more emphasis on utility and less on form and show ring characters.

Practically all soils in the South are poor. Nevertheless, there is abundant evidence that these poor lands may be made quite productive under good systems of management and with proper fertilization. Soil fertility problems, then, should have a prominent place in the research programs of our area. When each acre of land is made to produce as much as is economically feasible, and when each man day of labor is as efficient as possible through the use of adapted machines, southern farms will produce several times more than at present. All research work that adds to our information in these two broad fields will be important, since they will aid the farmer in his effort to produce more commodities for sale.

It should be understood that these are merely samples or suggestions as to the research program that needs to be developed. No one should infer that these are the only important lines of research needed in our expanding program of agriculture for the southern area. Nor should it be inferred that these are absolutely the most important lines of research. Possibly they are. However, these particular subjects have been mentioned because they follow so well along the lines of potential improvement that have been presented.

Southern farmers must have for sale several times as much produce as now comes from our area. However, at the risk of undue repetition, it should again be emphasized that it is absolutely essential that when we attempt to increase our production for sale on the American market, we must understand that the production program must be based on the best established facts so that the products of our farms may be produced economically enough for us to meet competition. When these conditions are met, and not until they are met, will southern farmers be as prosperous as they can and should be.

